SECTION 4

WELL TEST RECORDS

4.0 Well Test Records

During the drilling and completion of WDW-315 numerous tests were conducted to assure an environmentally safe injection well. Both casings were pressure tested following the cementing procedures. Two full hole cores were taken, one from the confining zone and another from the injection zone. Both cores were analyzed by an independent laboratory for porosity and permeability along compatibility testing with common acids, and a complete mineralogical analysis.

Injectivity and falloff tests were conducted after the original bottom hole pressure, temperature, and fluid sample were taken. The fluid sample was analyzed for several different fluid properties including pH, specific gravity, conductance, TDS, TSS and several anions and cations.

4.1 Original Bottom Hole Pressure and Temperature

The original bottom hole pressure and temperature were taken after the well was perforated on December 15, 1999. The original bottom hole pressure measured was 2518.52 psia at 6200 feet RKB. The original bottom hole temperature was 186.68°F. A plot of the data gathered for the static bottom hole pressure is provided as Figure 4-1.

4.1.1 Static Fluid Level

The static fluid level measured while going into the well for the original bottom hole pressure was at approximately 700 feet. The fluid in the wellbore at the time of measurement was 2% KCL water. The fluid level will be dependent on the weight of the fluid in the wellbore. With normal Cockfield formation brine in the wellbore the fluid level would probably be much lower.

4.2 Core Records

Two full hole cores were taken during the drilling of WDW-315. The first core was taken from a depth of 4600 feet in the Jackson Formation. The second core was taken from the Cockfield Formation.

4.2.1 Depths, Types and Recovery

The first core taken from the Jackson Formation (Confining Zone) was a full hole core (4 inch) at a depth of 4600 feet RKB. An attempt to core 30 feet of core proved impossible and only 18 inches of core was recovered. The core obtained was primarily clay.

The second core was taken from the Cockfield Formation (Injection Zone) at a depth of 6070 feet RKB. An attempt to core 30 feet was relatively successful with a little over 14 feet recovered. The core obtained was primarily a fine grained sandstone interbedded with siltstone.

4.2.2 Laboratory Tests

The cores were taken to Omni Labs to be tested. Tests on the confining zone sample was limited to a test for permeability which showed a value of 0.010 millidarcies. The tests performed on the injection zone samples included a compatibility study using various pH solutions of KCl. The results of the study is provided as Exhibit 7.

4.3 Injectivity / Falloff Test

The injectivity / falloff test was performed December 17-19, 1999. After the well was backflowed for 12 hours on December 16, 1999, the well was allowed to stabilize for 12 hours prior to the test. The test was performed using native formation fluid and brine water brought to the site. The injectivity part of the test was conducted by pumping the formation fluid and brine into the well at 3 barrels per minute (126 gpm) for 12 hours. The well was shut in and the falloff test was performed for approximately 32 hours following injection. The results of the test were analyzed by Mr. Peter Stan, reservoir engineer and are provided in Appendix B. A copy of the data disk is also provided in Appendix B.

4.4 Casing Pressure Tests

The surface casing and the long string casing were both tested prior to drilling out the float shoes. Both casings were tested for over 30 minutes. The surface casing was tested at 1200 psi for 40 minutes and showed no pressure loss. The test is presented in Figure 4-2.

The long string casing was tested at 1500 psi for 35 minutes and showed a 200 psi increase in pressure during the test. This was attributed to the hole being flushed with fresh water at ambient temperature (~50°F) just prior to the test. The fresh water heating up in the casing caused the increase in pressure during the test. The test is presented in Figure 4-3.

FROM : WGS ENVIRONMENTAL LAB PHONE NO. : 713 466 9882 Dec. 29 1999 12:33PM P1

TABLE 4-1

ACE Technologies, Inc.

17459 Village Green Dr.
Houston, TX 77040

Telephone: (713) 466-0958
Fax: (713) 466-9882

Client: Crossroads Environmental
16185 Creighton Rd
Conroe, Texas 77302-

Attn: Tom Roth

Sample ID: WDW-315

Sampling Date: 12/16/99
Sampling Time: 2100
Project:
Login Date: 12/17/99
Report Date: 12/29/99

Lab ID: 9910418

ANALYTICAL RESULTS

Parameter	[illegible]	Units	MDL	Method	Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
pH (Liquid)	7.07			150.1*	12/21/99	1625	LR		7.07	7.09	0.28	
Total Suspended Solids	278	mg/l	1	160.2*	12/23/99	1100	RW	<1	6720	6760	0.6	
Total Dissolved Solids	105000	mg/l	1.0	160.1*	12/21/99	1723	LR	<1.0	431	428	0.7	
Phosphorus (Total)	0.56	mg/l	0.01	365.2*	12/21/99	1100	MBR	<0.01	30.9	27.8	10.6	95.9
Alkalinity	484	mg/l CaCO3	2	2320 B**	12/28/99	1315	RW	<2	294	292	0.7	100
Bicarbonate (HCO3)	591	mg/l	2	2320 B**	12/28/99	1315	RW	<2	334	332	0.6	100
Carbonate (CO3)	0	mg/l	2	2320 B**	12/28/99	1315	RW	<2	12	12	0	100
Hydroxide	0	mg/l		2320 B**	12/28/99	1315	RW					
Chloride	62000	mg/l	2	325.3*	12/22/99	1250	GR	<2	87	85	2.3	99.9
Specific Conductivity	125000	umhos/cm	1.9	2510 B**	12/21/99	1825	RW	1.9	129000	13000	0.8	100
Sulfate	56	mg/l	2	375.4*	12/22/99	1430	GR	<2	52	53	2	115
Anion-Cation Balance	-0.99	meq/l		1030 F**	12/29/99	1100	RKG					
Barium	83.5	mg/l	0.01	208.1*	12/27/99		SB					
Calcium	1100	mg/l	0.10	215.1*	12/21/99	1400	PR	<0.10	7.40	7.40	0	94.8
Iron	36.4	mg/l	0.10	236.1*	12/21/99	1515	PR	<0.10	2.02	2.02	0	97.6
Magnesium	291	mg/l	0.05	242.1*	12/21/99	1430	PR	<0.05	1.31	1.32	0.8	96.9
Potassium	253	mg/l	0.33	258.1*	12/17/99	1045	PR	<0.33	5.70	5.70	0	95.8
Sodium	38900	mg/l	2.5	273.1*	12/21/99	1500	PR	<2.5	351	351	0	92.6

MDL: Method Detection Limit %D: % Deviation %R: % Recovery

Quality Assurance: Samples are analyzed in accordance with EPA and SW 846 Solid Waste method procedures with at least 10% analyzed in duplicate; Serial dilution and/or process spikes are routinely employed to assure accuracy and precision in the reported data.

* Methods for Chemical Analysis of Water and Wastes, EPA, March 1983
** Standard Methods for the Examination of Water and Wastewater, 18th Edition
*** Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Edition

ACE Technologies, Inc.

Dr. Siva Palchuru
Laboratory Director

Post-it® Fax Note 7671

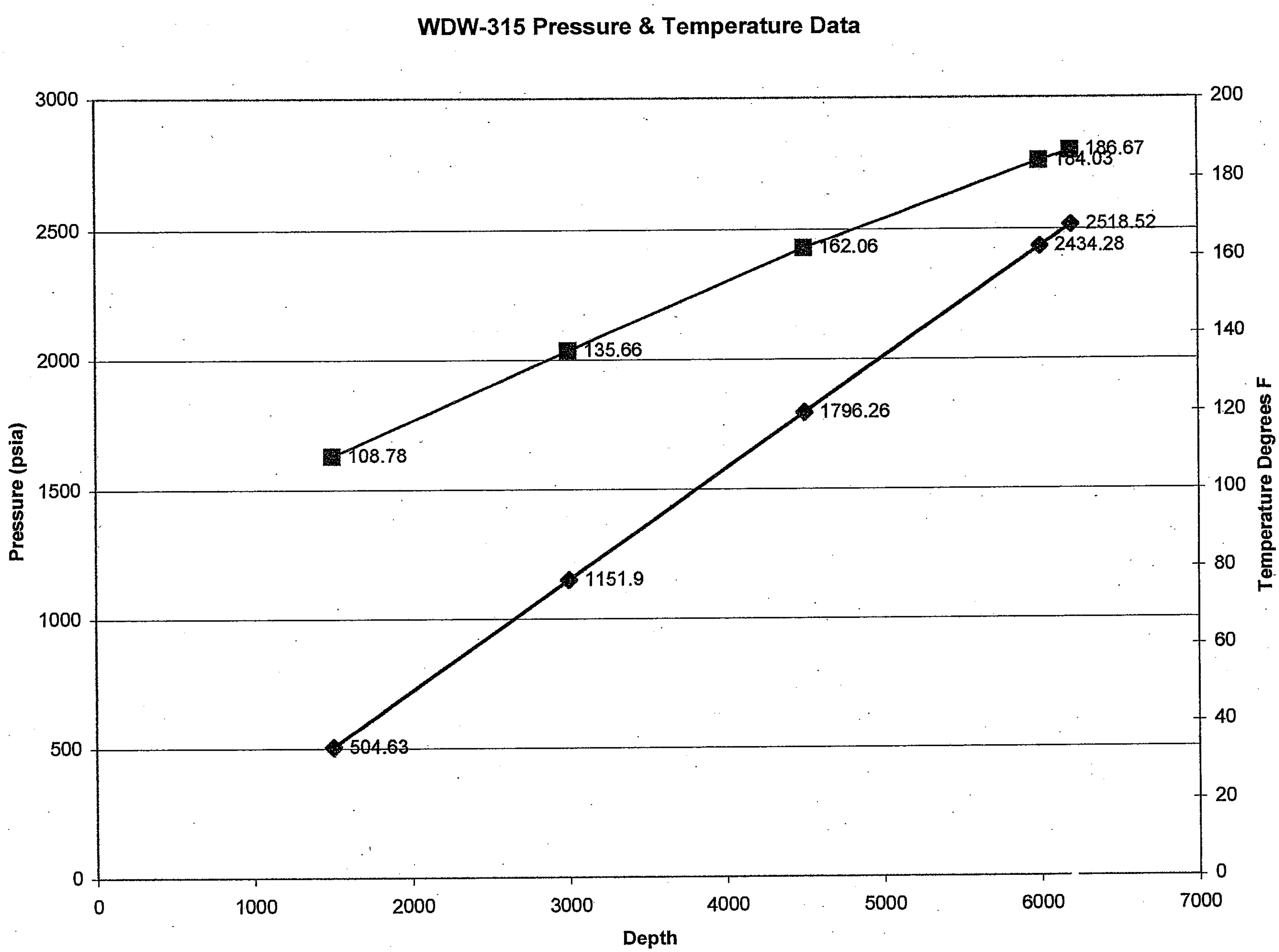
Date	# of pages ▶
To Tom Roth	From
Co./Dept. Crossroads	Co.
Phone #	Phone #
Fax # 281-890-5892	Fax #

Specific Gravity - 1.08

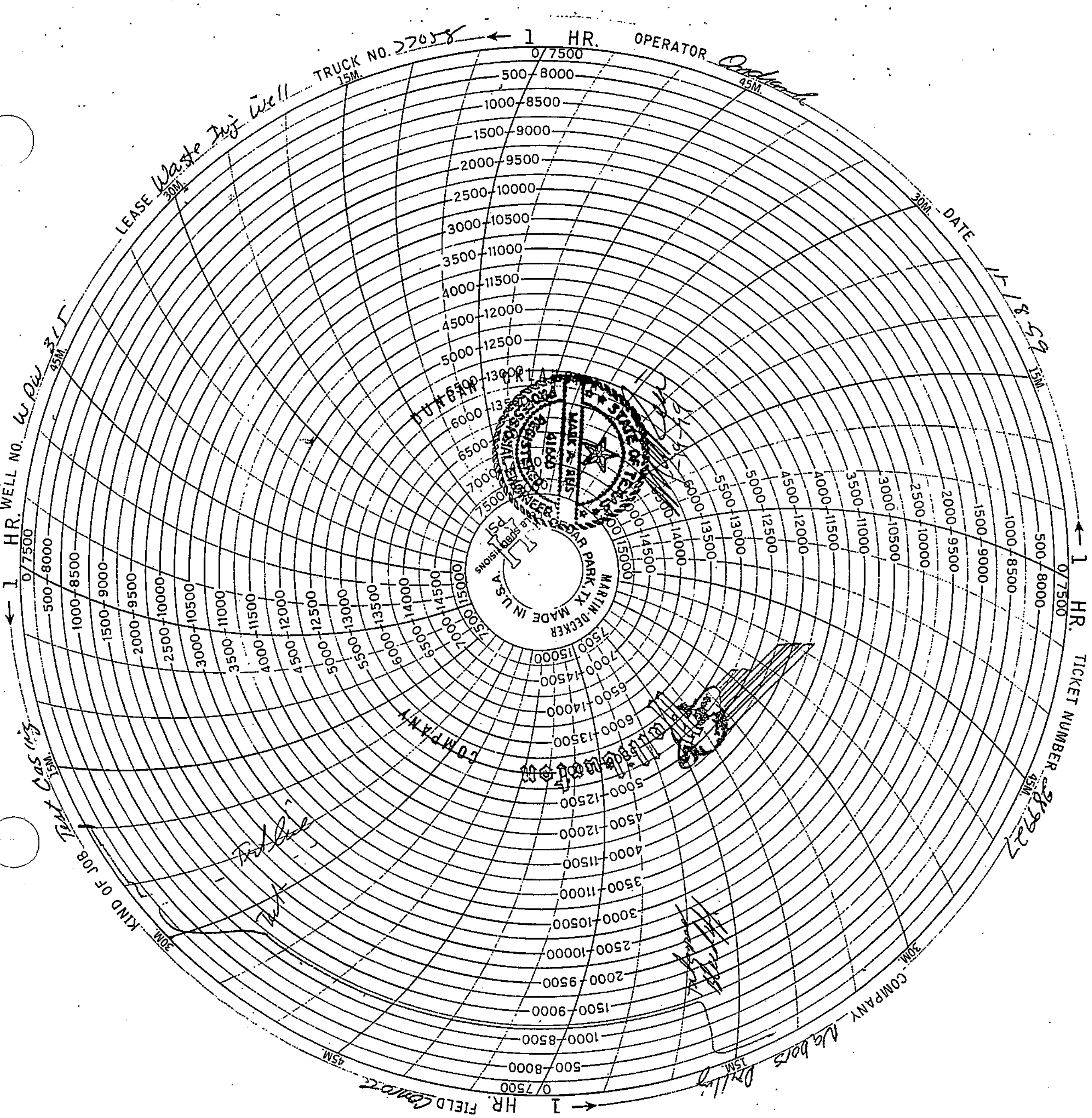
Edna Wood Laboratories

FROM : WGS ENVIRONMENTAL LAB PHONE NO. : 713 466 9882 Dec. 29 1999 12:34PM P2

FIGURE 4-1



WDW-315 Pressure & Temperature Data
Pressure (psia)
3000
2500
2000
1500
1000
500
0
Temperature Degrees F
200
180
160
140
120
100
80
60
40
20
0
Depth
0
1000
2000
3000
4000
5000
6000
7000
108.78
135.66
162.06
184.03
186.67
504.63
1151.9
1796.26
2434.28
2518.52



TRUCK NO. 27058
1 HR.
OPERATOR
LEASE Waste Inj Well
DATE
WELL NO. WDW 315
TICKET NUMBER
KIND OF JOB Test Csg
COMPANY Nabors Drlg
FIELD
MARTIN-DECKER
CEDAR PARK, TX
MADE IN U.S.A.
PSI

FIGURE 4-2

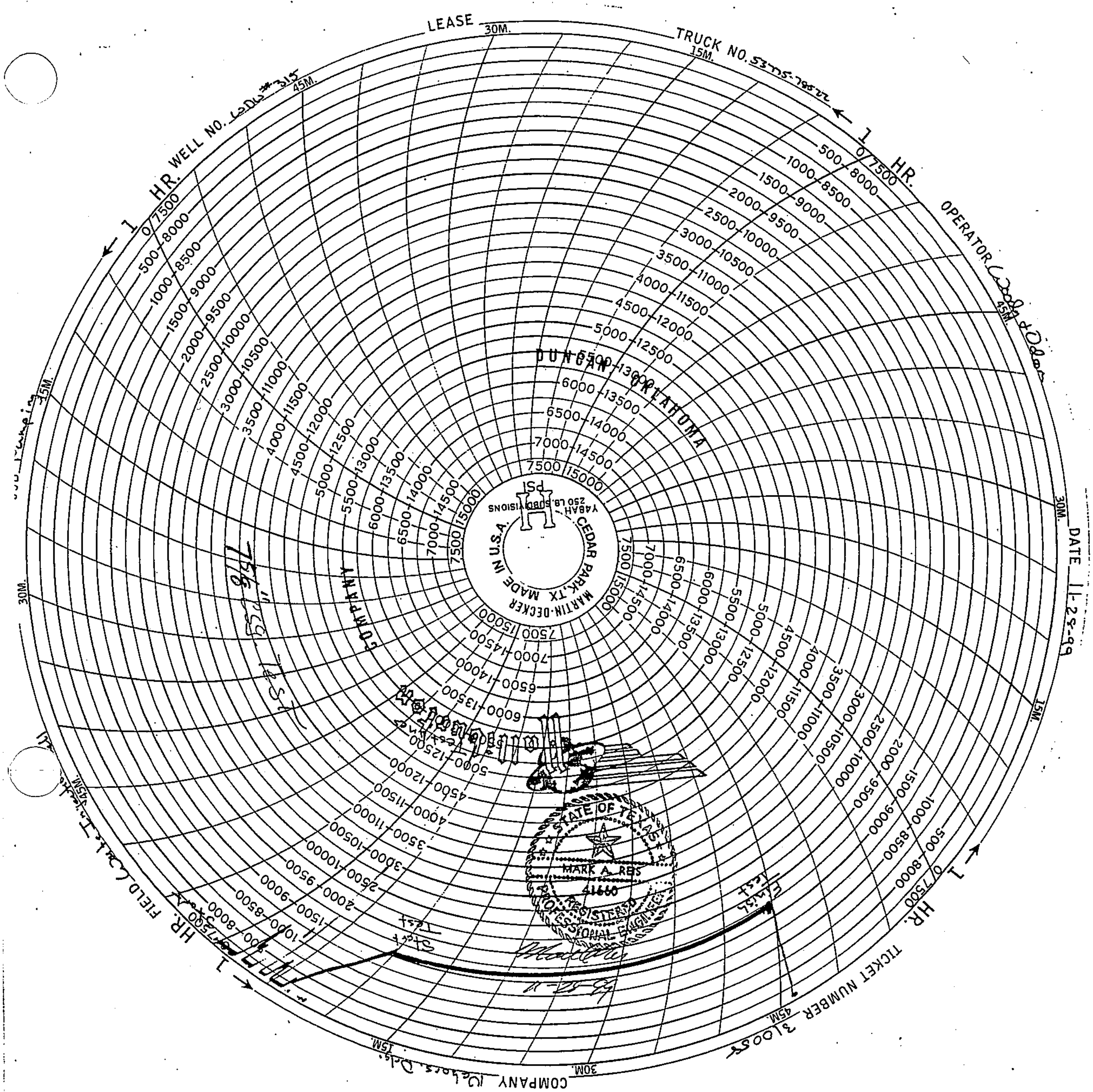
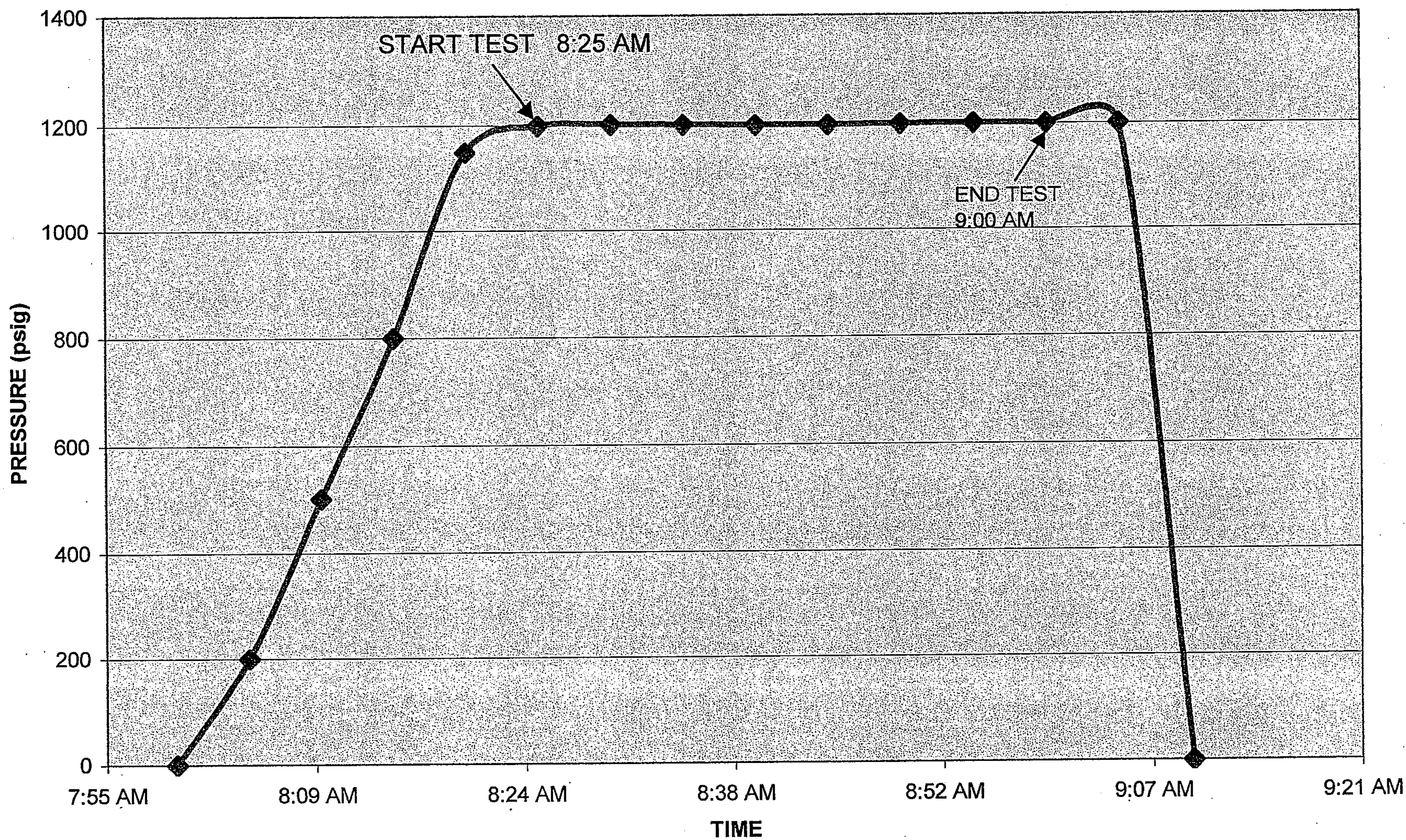


FIGURE 4-3

FIGURE 4-5

WDW-315 ANNULUS PRESSURE TEST



PETROGRAPHIC ANALYSIS

X-ray diffraction (XRD) analysis, thin section petrography, and scanning electron microscopy (SEM) were performed on three (3) conventional core samples from the WDW 315 No. 1 Well (see Appendices B through D, respectively). Table 1 (below) shows the sample depths and the analyses performed.

TABLE 1

SAMPLE DEPTHS AND ANALYSES PERFORMED

Sample Depth	Thin Section Petrography	X-Ray Diffraction	Scanning Electron Microscopy
6071.52'	X	X	X
6077.55'	X	X	X
6082.96	X	X	X

The objectives of these analyses were to: 1) characterize the sample texture and mineralogy; 2) examine porosity development and determine controls on porosity and permeability; 3) evaluate the formation for sensitivity to completion fluids; and 4) determine the effects of mineralogy on log response.

Summary Of Petrographic Results

The samples analyzed by thin section (Appendix C) are moderately to moderately well sorted, and range in fabric from massive (6071.52') to laminated (6077.55' and 6082.96'). The sample taken from 6077.55' is a siltstone with an average grain size of 0.02mm. The remaining two samples are sandstones that are very fine- (6071.52') and fine-grained (6082.96').

Some features are common to each of the samples. Quartz is the dominant framework grain type, with lesser amounts of feldspars and lithic fragments also present. Porosity development is moderate to good in the samples analyzed and is strongly controlled by the amount and distribution of remaining effective porosity. Porosity distribution is influenced by 1) cementation, especially by the zeolite mineral analcime; and to a lesser extent; 2) pore-filling kaolinitic clay; and 3) low sediment compaction. Other components observed in minor amounts include micas, organic material, glauconite, and the heavy minerals metamorphic chlorite, tourmaline, and zircon.

Petrographic results are summarized in Table 1 shown below.

TABLE 1

SUMMARY OF PETROGRAPHY RESULTS

Sample Depth	Grain Size Avg. (mm)	Resistivity Suppression	Fabric	Matrix (%)	Secondary Cement (%)	Porosity Development
6071.52'	0.10	None	Massive	Trace	9	Good
6077.55'	0.02	Strong	Laminated	21	14	Moderate
6082.96	0.15	Slight	Laminated	7	18	Moderate

PETROGRAPHIC RESULTS

Sedimentary Fabric and Texture

The samples analyzed by thin section (Appendix C) are moderately to moderately well sorted, and range in fabric from massive (6071.52') to laminated (6077.55' and 6082.96'). The sample taken from 6077.55' is a siltstone with an average grain size of 0.02mm. The remaining two samples are sandstones that are very fine- (6071.52') and fine-grained (6082.96'). The laminated samples contain continuous (across the length of a thin section) laminations that are fairly thin. In general, the angularity of the grains ranges from angular to subrounded, with most grains being subangular.

Framework Grain Mineralogy

The most common framework grain type in the sandstones and siltstone is monocrystalline quartz (26%-33%). Other framework components include various lithic fragments (6%-14% total lithics), plagioclase feldspar (3%-7%), K-feldspar (2%-3%), and polycrystalline quartz (trace-1%). Accessory grains include muscovite mica and the mature heavy minerals metamorphic chlorite, tourmaline, and zircon. Environmental indicators include glauconite, and organic material. Glauconite is an indicator of marine depositional influence. Compositionally, the sandstones are similar and are classified by the Folk (1980) method as feldspathic litharenites.

Cementation

The dominant cement in these samples is the zeolite mineral analcime. Analcime (0%-14%) forms as a patchy pore filling and is very sensitive to some acids (see Formation Sensitivity section). Other cements observed in low amounts include pore-lining clay (1%-5%), secondary quartz overgrowths (trace), dolomite (0%-3%), siderite (0%-1%), pyrite (2%-3%), and authigenic kaolinite (0%-3%). Quartz overgrowths form as flat to pseudohexagonal nucleations on host quartz sand grains. The carbonate minerals (dolomite and siderite) occur as a patchy pore-filling, or as individual crystals. Pyrite occurs as aggregates of pore-filling microcrystals, as well as a replacement product of organic material. Kaolinite is discussed in the following section on "Clay Mineralogy".

Clay Mineralogy

X-ray diffraction (XRD) analysis (Appendix B) of the three samples reveals a total clay content ranging from 9%-25%, by weight. The clay types present are kaolinite (3%-10%), illite (1%-6%), mixed-layer illite/smectite (4%-9%), and chlorite (trace-3%). SEM analysis shows that illite and mixed-layer illite/smectite are finely intermixed and occur largely as a detrital pore-filling matrix component with a patchy distribution, or occur as the main components of shale laminations. Authigenic secondary chlorite occurs as flat platelets with a face-to edge orientation and is found as a discontinuous grain-coating clay, especially at 6082.96'. Authigenic kaolinite is the most commonly observed secondary clay mineral, and is found as patchy pore-fillings of booklet aggregates. All clay types are also found in association with certain lithic fragment types.

Formation Sensitivity

Several components found in these samples may exhibit sensitivity to certain completion fluids. Mineral components that exhibit these traits include analcime, authigenic kaolinite, and carbonates.

The most sensitive mineral component detected at 6071.52' and 6082.96' is analcime. This zeolite mineral is seen as a precipitate that infills pores and pore throats. Conventional HCl and HCl - HF acid systems *are not* recommended for these intervals because of the presence of this zeolite. A chemically inert gelatinous mass forms with exposure of analcime to these acid systems. Recent studies have shown that even small amounts of this zeolite in a formation can cause major production declines upon contact with strong acid systems and incompatible fluids. Therefore, the recommended clean-up acid is 10% acetic acid or a combination of 10% acetic and 5% HCl acid.

Authigenic kaolinite is seen as small aggregates of booklets that are loosely bound to pore walls. This loosely bound clay is a fines migration concern. These kaolinite booklets can migrate, especially during wettability changes in the formation, and can "brushpile" into pore throats during high flow rates, effectively reducing zonal permeability. It is recommended that high flow rates be avoided, and flow testing of completion and disposal fluids be performed, to determine the effect of moveable kaolinite to sample permeability.

The carbonate minerals dolomite and siderite are detected by both thin section analysis and XRD. However, these components are found in low amounts (5% or less, by weight from XRD data). These pore-filling cements are generally found within shaly laminations. Only minor amounts of these carbonates can be seen in the sand/silt portions of these samples. Generally, HCL acid is recommended to clean up the wellbore when carbonates are present. However, the presence of analcime precludes the use of HF or HCl acid systems, and acetic acid is recommended as a clean up acid. Since carbonate volume and location are not a concern, acid should only be used to establish communication with the wellbore.

Mineralogic Influences on Log Response

The following section discusses the effects on log response of the mineralogy and associated porosity types found in these samples.

1. Resistivity Logs: The main factors that may suppress resistivity in these intervals are "water bound" microporosity associated with pore-filling authigenic kaolinite, grain-coating chlorite, and thin, clay-rich laminations. Resistivity suppression within the analyzed zones due to mineralogy is expected to variable (see Table 1).

2. Density Logs: The samples analyzed from this well contain the high density minerals dolomite, siderite, and pyrite. Each of these minerals, however, are seen in only minor amounts and are not expected to affect the overall density of the samples. Core analysis indicates that the measured grain density of the samples ranges from 2.64gm/cc to 2.69gm/cc.

3. Gamma-Ray Log: Gamma-ray logs respond to radioactive isotopes. The clay minerals kaolinite (average 6% by weight from XRD) and chlorite (average 1% by weight from XRD) will not be detected by gamma-ray logs due to the absence of potassium in these minerals. Conversely, the mineral K-feldspar (average 6% by weight from XRD) will be detected as "clay" by gamma-ray logs due to the presence of potassium in this mineral. The combined effect of these components will not affect the gamma-ray log response.

APPENDIX A

PETROGRAPHIC ANALYTICAL PROCEDURES

X-ray Diffraction (XRD) Analysis

A representative portion of each sample was dried, extracted if necessary, and then ground in a Brinkman MM-2 Retsch Mill to a fine powder. This ground sample was next loaded into an aluminum sample holder. This "bulk" sample mount was scanned with a Philips X-ray diffractometer using nickel-filtered copper K-alpha radiation at standard scanning parameters. Computer analysis of the diffractograms provide qualitative identification of mineral phases and semiquantitative analysis of the relative abundance (in weight percent) of the various mineral phases. It should also be noted that X-ray diffraction **does not** allow the detection and identification of non-crystalline (amorphous) material, such as organic material.

An oriented clay fraction mount was prepared for each sample from the ground powder. The samples were further size fractionated by centrifuge to separate the <4 micron fraction. Ultrasonic treatment was used to suspend the material, then a dispersant was used to prevent flocculation when noted. The solution containing the clay fraction was then passed through a Fisher filter membrane apparatus allowing the solids to be collected on a cellulose membrane filter. These solids were then mounted on a glass slide, dried, and scanned with the Philips diffractometer. The oriented clay mount was glycolated and another diffractogram prepared to identify the expandable, water sensitive minerals. The samples were also heat treated, to aid in distinguishing kaolinite and chlorite.

Thin Section Petrographic Analysis

Samples selected for thin section analysis were prepared by first vacuum impregnating with blue-dyed epoxy. The samples were then mounted on an optical glass slide and cut and lapped in water to a thickness of 0.03 mm. The prepared sections were then covered with index oil and temporary cover slips, and then analyzed using standard petrographic techniques.

Scanning Electron Microscopy (SEM) Analysis

Samples selected for scanning electron microscopy analysis were first broken, or split, to expose fresh surfaces. The samples were then mounted on sample holders with a conductive carbon paste and coated with gold in a "cool" sputter coater to prevent heat damage to sensitive clay minerals or friable samples. The samples were analyzed with a SM-3000 Topcon Digital Scanning Electron Microscope and Tracor Northern Energy Dispersive Spectrometer (EDS).

APPENDIX B

X-RAY DIFFRACTION DATA

OMNI LABORATORIES, INC.
X-RAY DIFFRACTION
(WEIGHT %)

Client: Crossroads Environmental
Well: WDW 315 (Montgomery County, TX)

File No:
Date: 07/28/05

Sample	CLAYS				CARBONATES			OTHER MINERALS						TOTALS		
Depth	Chlorite	Kaolinite	Illite	Mixed*	Calcite	Dolomite	Siderite	Quartz	K-spar	Plag.	Pyrite	Analcime	Halite	Clays	Carb.	Other
6071.52'	Tr	4	1	4	0	Tr	Tr	72	7	10	1	1	Tr	9	Tr	91
6077.55'	Tr	10	6	9	0	3	2	52	7	10	1	0	Tr	25	5	70
6082.76'	3	3	1	4	1	Tr	1	69	4	6	3	5	Tr	11	2	87
AVERAGE	1	6	3	5	Tr	1	1	64	6	9	2	2	Tr	15	2	83

* Randomly-interstratified mixed-layer illite/smectite containing approximately 75% expandable (smectitic) interlayers.

APPENDIX C

THIN SECTION ANALYSIS RESULTS
AND
THIN SECTION PHOTOMICROGRAPHS

OMNI Laboratories, Inc.

SUMMARY OF PERMEABILITY TO LIQUID RESULTS

Shale Sample

Crossroads Environmental
WDW 315 No. 1
East Conroe Field

Montgomery County, Texas
File No. H-3260

Core Number	Sample Number	Sample Depth, feet	Permeability, to Air millidarcys
			2000 psi
1	1	4600	0.010

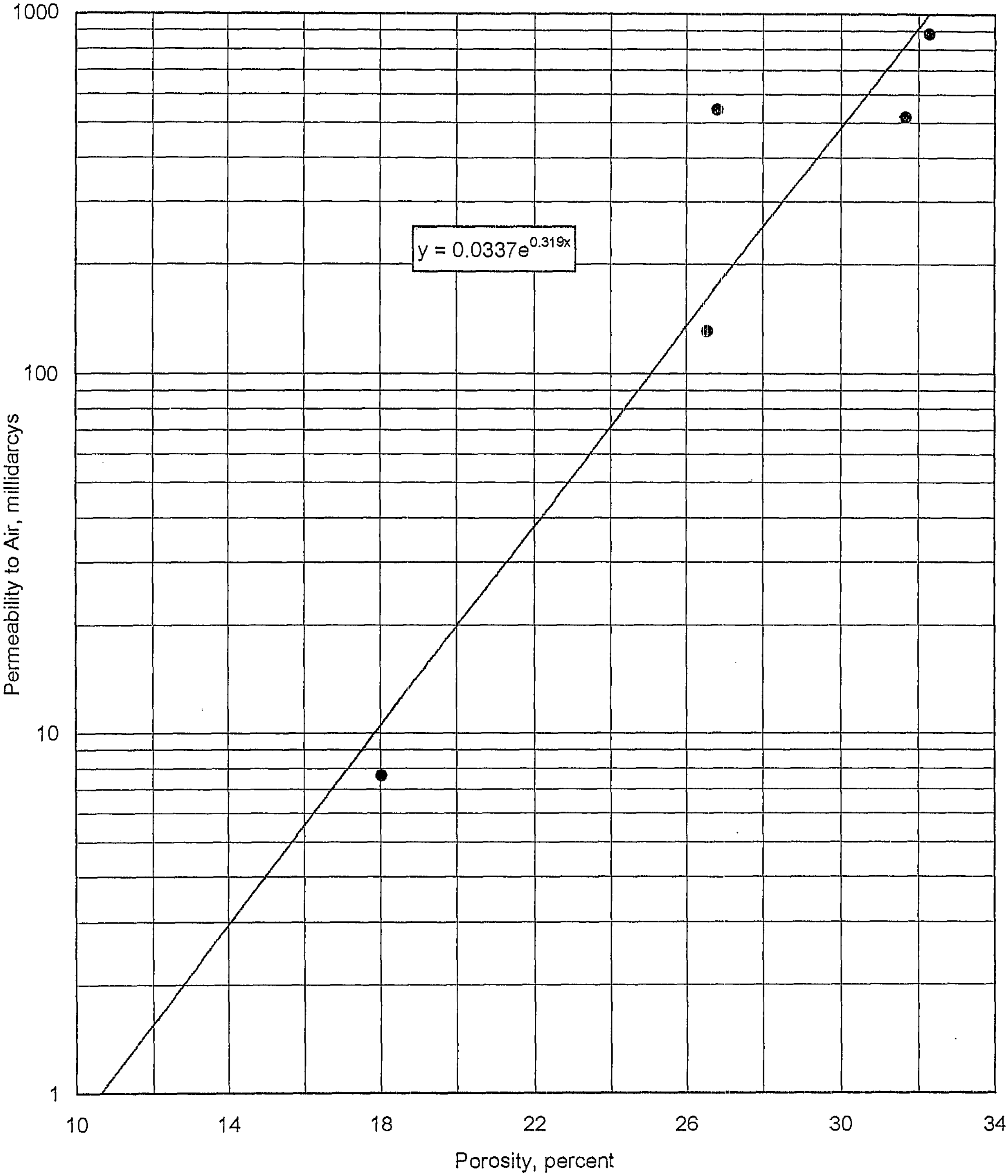
OMNI Laboratories, Inc.

PERMEABILITY VERSUS POROSITY

Routine Samples

Crossroads Environmental
WDW 315 No. 1
East Conroe Field

Montgomery County, Texas
File No. H-3260



● 2300 psi '

OMNI Laboratories, Inc.

SUMMARY OF ROUTINE CORE ANALYSES RESULTS

Routine Samples

Crossroads Environmental
WDW 315 No. 1
East Conroe Field

Montgomery County, Texas
File No. H-3260

Core Number	Sample Number	Sample Depth, feet	Permeability, millidarcys to Air 2000 psi	Permeability, millidarcys Klinkenberg 2000 psi	Porosity, percent 2000 psi	Porosity, percent Ambient	Grain Density, gm/cc
2	1	6071.52	518.	485.	31.7	34.1	2.66
2	2	6073.25	882.	836.	32.3	33.4	2.65
2	3	6077.55	545.	511.	26.8	27.7	2.64
2	4	6080.20	131.	117.	26.6	27.8	2.66
2	5	6082.96	7.63	6.00	18.0	19.3	2.69
		Average values:	417.	391.	27.1	28.5	2.66

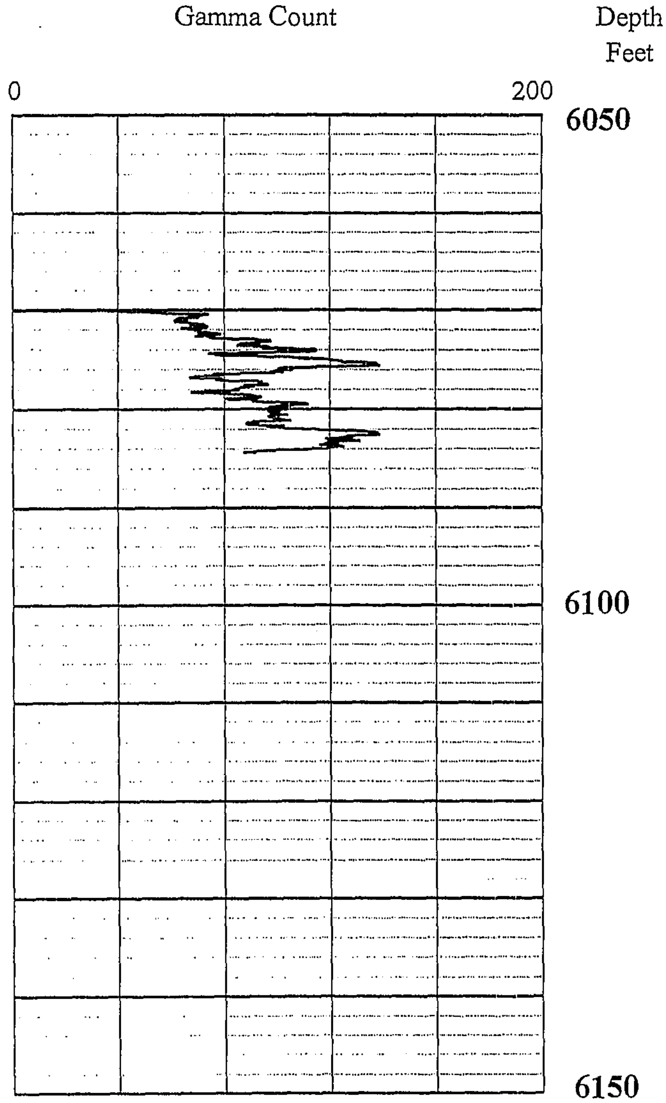
OMNI Laboratories, Inc.

Company: Crossroads Environmental Corporation
Well: WDW 315 No. 1
Field: East Conroe Field
Location: Montgomery County, Texas

File No.: H-3260
Analyst: Anderson
Date: 11/22/1999
Cores: Baker

CORE GAMMA RAY LOG PLOT

VERTICAL SCALE 5":100'



Core #	Total interval
2	6070-6084.4

APPENDIX D

SCANNING ELECTRON MICROSCOPE PHOTOMICROGRAPHS AND DESCRIPTIONS

(Note the micron bar at the lower portion of each photomicrograph for scale)

OMNI Laboratories, Inc.

ACID CONSUMPTION

Process Water Neutralization

Crossroads Enviromental
WDW 315 No. 1

Montgomery County, Texas
File No. H-3260

Initial pH	Weight of Process Water, grams	Final pH	HCl Acid Concentration, percent	Weight of HCl Added, grams	HCl Acid Consumption, grams/gram
11.05	501.20	8.10	35	37.	0.075
11.05	503.24	4.01	35	40.	0.080

OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

Extracted-State Sample

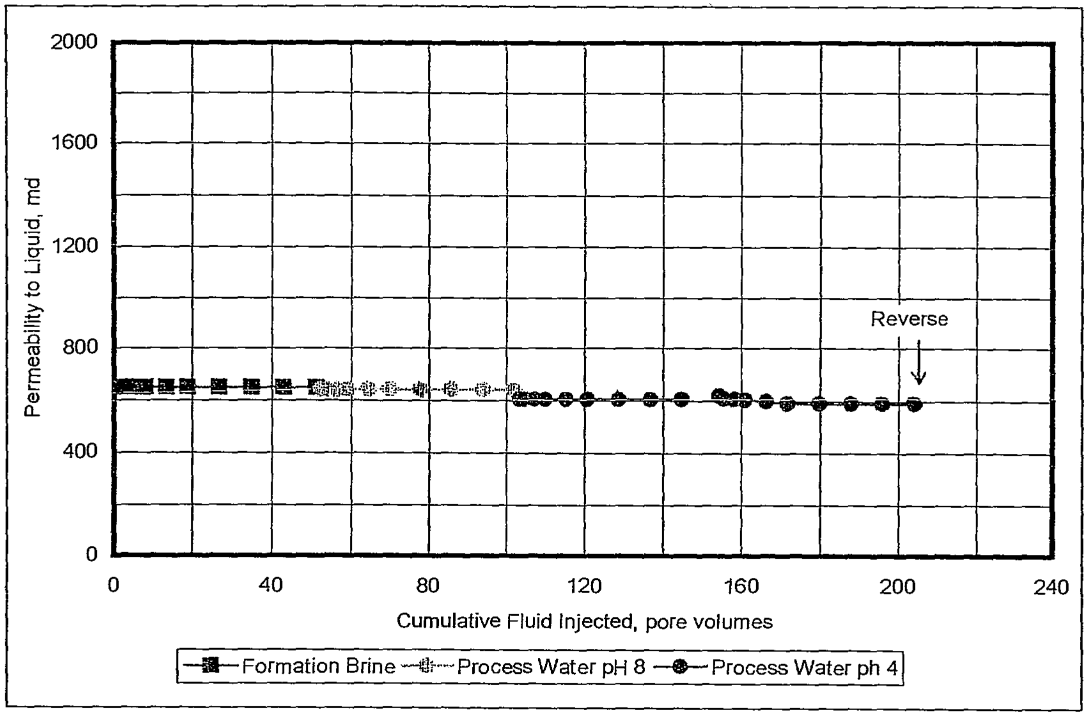
Net Confining Stress: 300 psi Temperature: 150°F

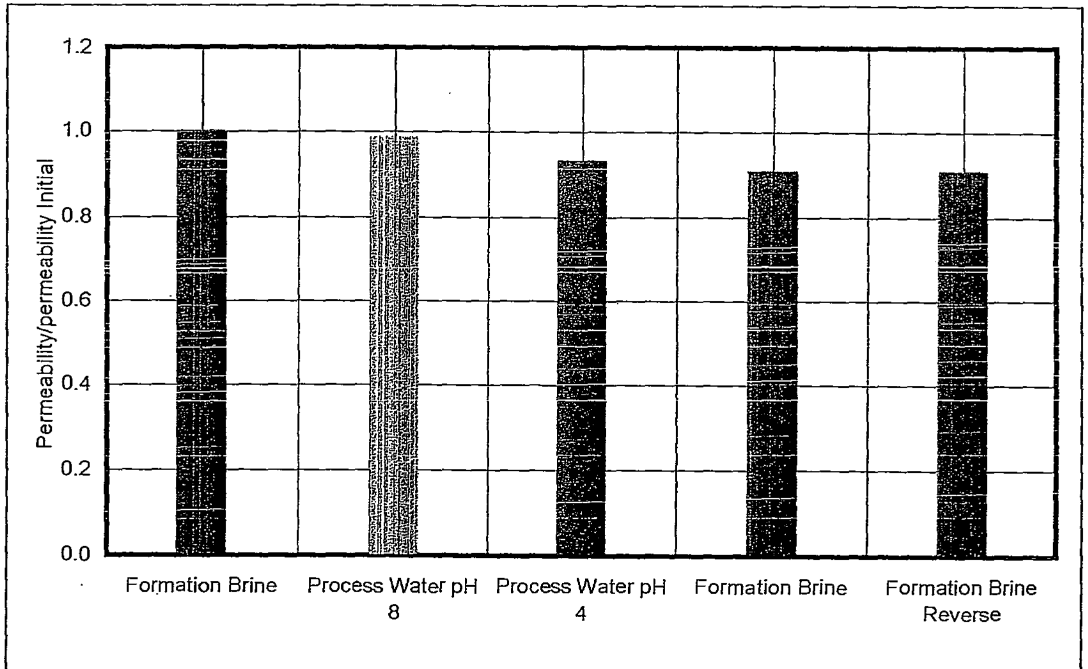
Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-1A
Sample Depth, feet:	6071.28
Permeability to Air, md*:	900
Porosity, fraction*:	0.320
Injection Fluid:	Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
	fluid	total		
Formation Brine	1.34	1.34	650.	1.000
	2.68	2.68	650.	1.000
	5.37	5.37	650.	1.000
	8.0	8.0	650.	1.000
	13.4	13.4	650.	1.000
	18.8	18.8	650.	1.000
	26.8	26.8	650.	1.000
	34.9	34.9	650.	1.000
	42.9	42.9	650.	1.000
	51.0	51.0	650.	1.000
Process Water pH 8 HCl	1.34	52.3	640.	0.986
	2.68	53.7	640.	0.986
	5.37	56.3	640.	0.986
	8.05	59.0	640.	0.986
	13.4	64.4	640.	0.986
	18.8	69.8	640.	0.986
	26.8	77.8	640.	0.986
	34.9	85.9	640.	0.986
	42.9	93.9	640.	0.986
	51.0	102.0	640.	0.986
Process Water pH 4 HCl	1.34	103.	605.	0.931
	2.68	105.	605.	0.931
	5.37	107.	605.	0.931
	8.05	110.	605.	0.931
	13.4	115.	605.	0.931
	18.8	121.	605.	0.931
	26.8	129.	605.	0.931
	34.9	137.	605.	0.931
	42.9	145.	605.	0.931
	51.0	153.	605.	0.931

7-21-00





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

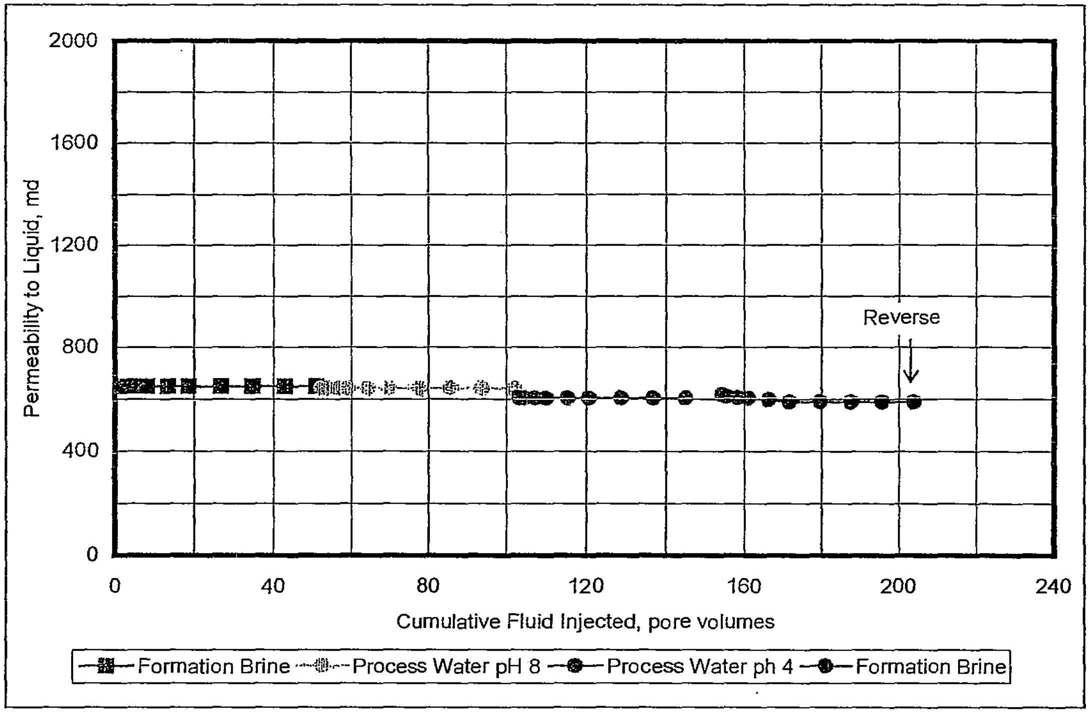
Extracted-State Sample

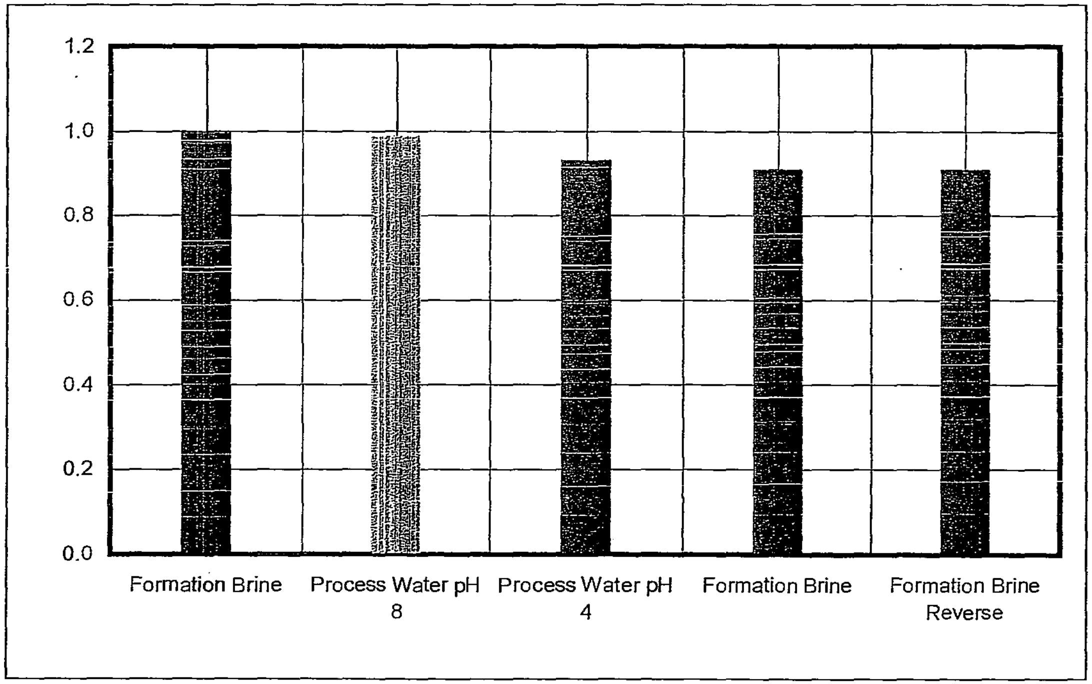
Net Confining Stress: 2000 psi Temperature: 150°F

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-1A
Sample Depth, feet:	6071.28
Permeability to Air, md*:	900
Porosity, fraction*:	0.320
Injection Fluid:	Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
	fluid	total		
Formation Brine	1.34	154.	619.	0.952
	2.68	156.	610.	0.939
	5.37	158.	607.	0.935
	8.05	161.	604.	0.930
	13.4	166.	599.	0.922
	18.8	172.	591.	0.909
	26.8	180.	591.	0.909
	34.9	188.	591.	0.909
	42.9	196.	591.	0.909
	51.0	204.	591.	0.909
Reverse	-	204.	591.	0.909





* Estimated

7-21-00

OMNI Laboratories, Inc.

ACID CONSUMPTION

Process Water Neutralization

Crossroads Enviromental
WDW 315 No. 1

Montgomery County, Texas
File No. H-3260

Initial pH	Weight of Process Water, grams	Final pH	Acetic Acid Concentration, percent	Weight of Acetic Acid Added, grams	Acetic Acid Consumption, grams/gram
11.05	100.00	4.05	10	127.	1.274
11.05	565.44	4.01	99	118.	0.209
11.05	99.93	8.02	10	24.	0.238
11.05	540.14	8.04	99	28.	0.053
11.05	100.00	8.06	10	27.	0.269
11.05	565.44	8.01	99	32.	0.056

OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

Extracted-State Sample

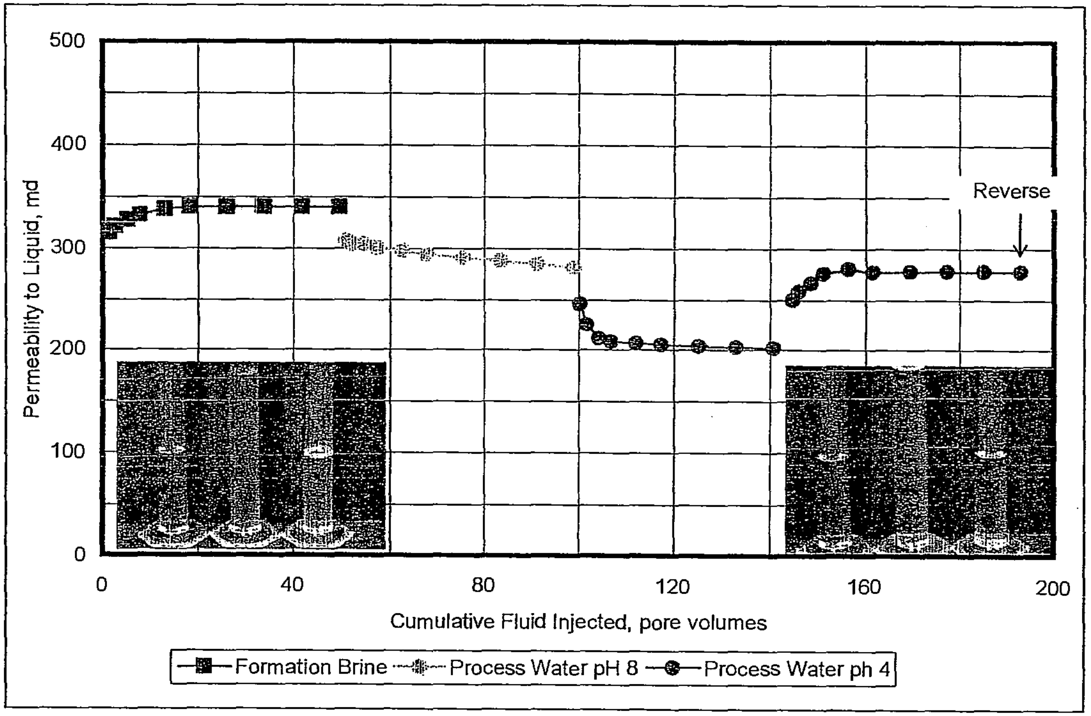
Net Confining Stress: 2000 psi Temperature: 150°F

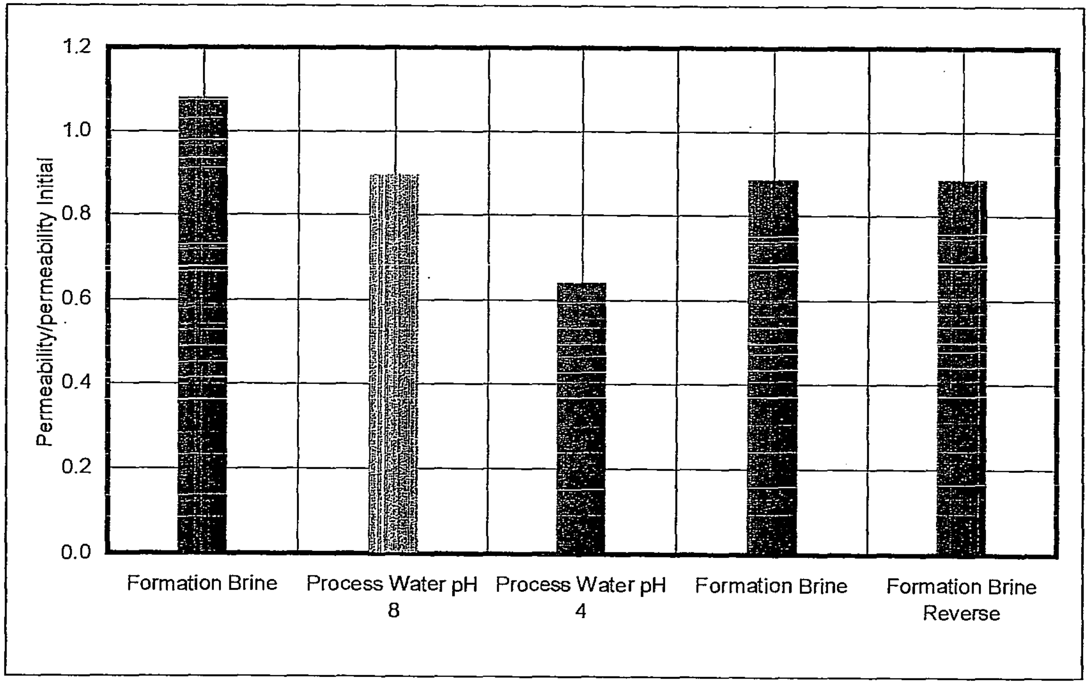
Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number: 2-3
Sample Depth, feet: 6077.55
Permeability to Air, md: 545
Porosity, fraction: 0.268
Injection Fluid: Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
	fluid	total		
Formation Brine	1.30	1.30	315.	1.000
	2.61	2.61	322.	1.020
	5.21	5.21	328.	1.041
	7.8	7.8	333.	1.056
	13.0	13.0	338.	1.073
	18.2	18.2	341.	1.080
	26.1	26.1	341.	1.080
	33.9	33.9	341.	1.080
	41.7	41.7	341.	1.080
	49.5	49.5	341.	1.080
Process Water pH 8 Acetic	1.30	50.8	307.	0.975
	2.61	52.1	304.	0.964
	5.21	54.7	304.	0.964
	7.82	57.3	301.	0.953
	13.0	62.5	297.	0.943
	18.2	67.8	294.	0.933
	26.1	75.6	291.	0.923
	33.9	83.4	288.	0.913
	41.7	91.2	285.	0.903
	49.5	99.0	282.	0.894
Process Water pH 4 Acetic	1.30	100.	246.	0.780
	2.61	102.	225.	0.715
	5.21	104.	211.	0.670
	7.82	107.	208.	0.660
	13.0	112.	207.	0.655
	18.2	117.	205.	0.650
	26.1	125.	203.	0.645
	33.9	133.	203.	0.642
	41.7	141.	202.	0.640
	49.5	149.	201.	0.638

7-20-00





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

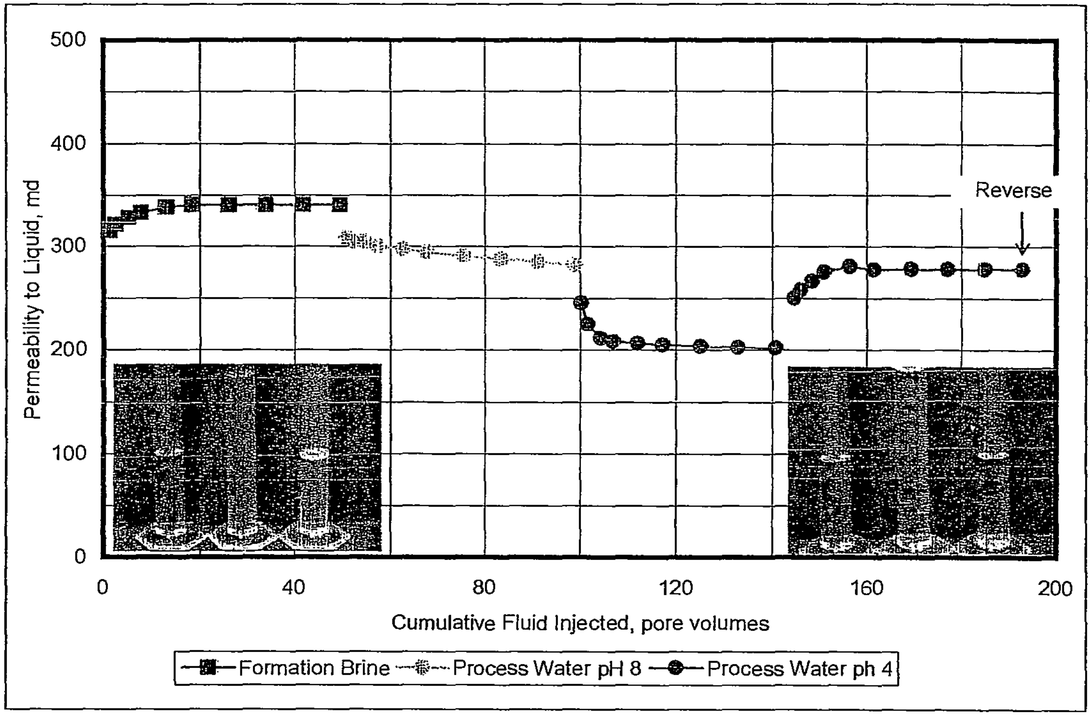
Extracted-State Sample

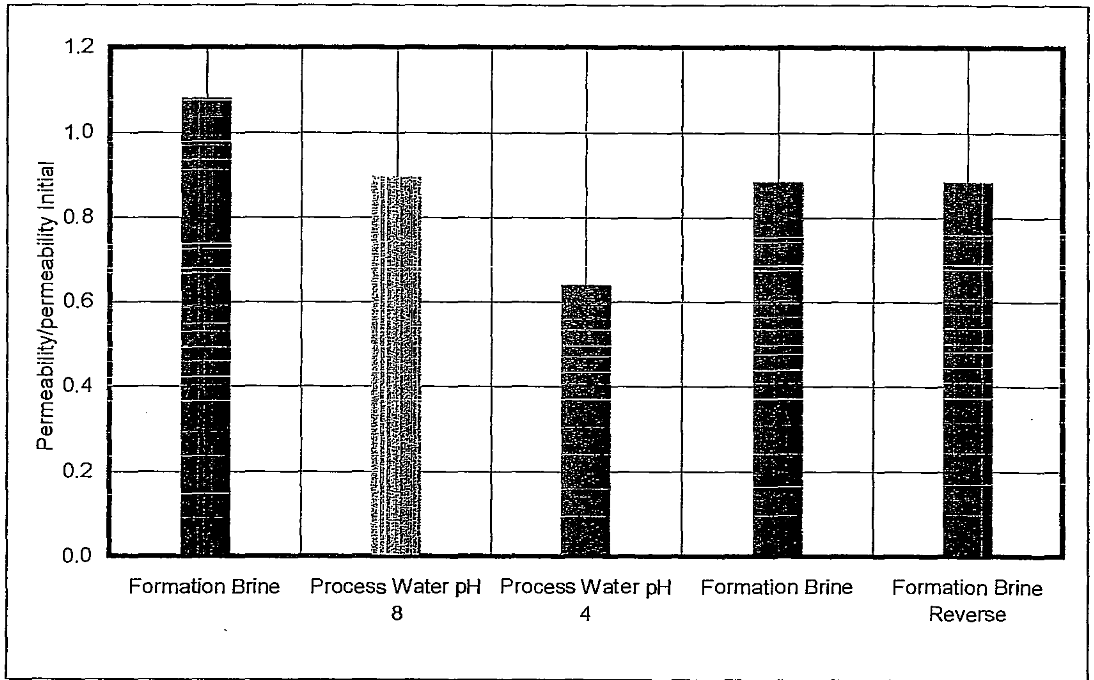
Net Confining Stress: 2000 psi Temperature: 150°F

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-3
Sample Depth, feet:	6077.55
Permeability to Air, md:	545
Porosity, fraction:	0.268
Injection Fluid:	Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes: fluid	Cumulative Fluid Injected, pore volumes: total	Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
Formation Brine	1.30	145.	250.	0.794
	2.61	146.	258.	0.819
	5.21	149.	267.	0.846
	7.82	151.	276.	0.875
	13.0	156.	281.	0.890
	18.2	162.	278.	0.881
	26.1	169.	278.	0.883
	33.9	177.	278.	0.883
	41.7	185.	278.	0.883
	49.5	193.	278.	0.883
Reverse	-	193.	278.	0.883





7-20-00

OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

Extracted-State Sample

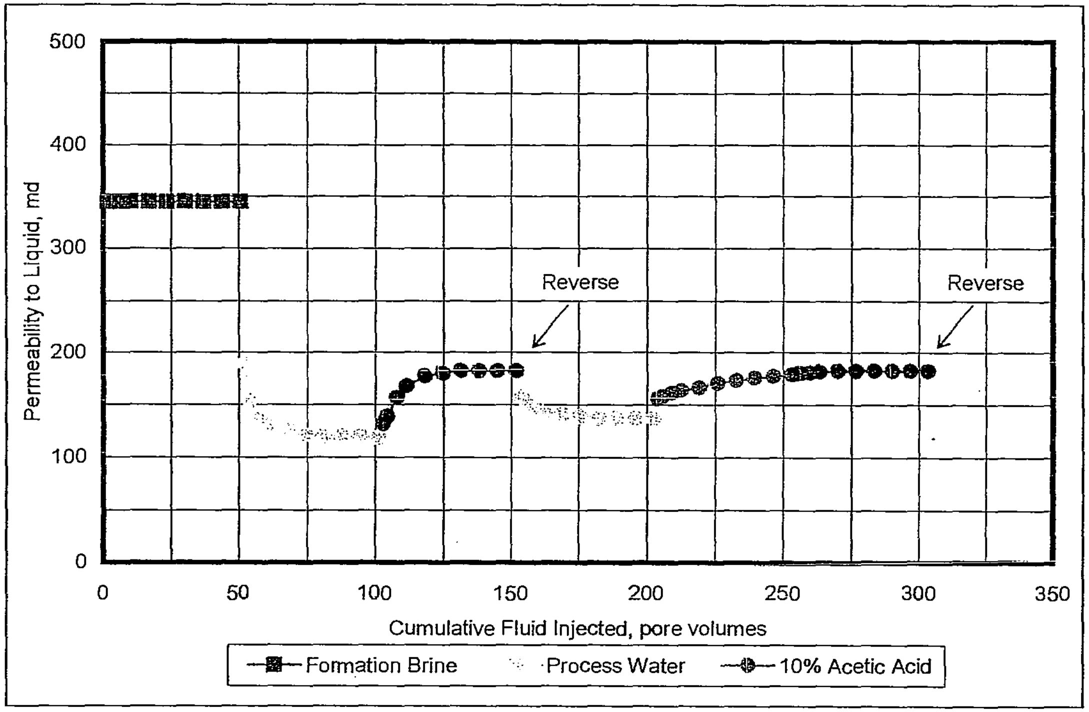
Net Confining Stress: 2000 psi Temperature: 150°F

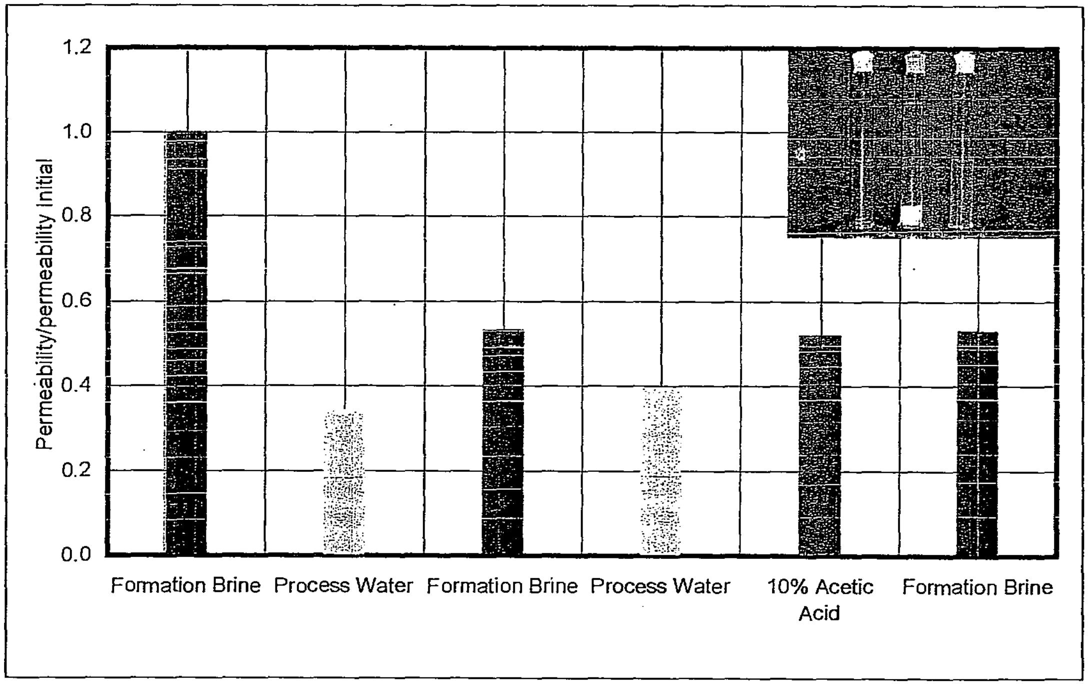
Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number: 2-1
Sample Depth, feet: 6071.52
Permeability to Air, md: 518
Porosity, fraction: 0.317
Injection Fluid: Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes: fluid	Cumulative Fluid Injected, pore volumes: total	Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
Formation Brine	1.69	1.69	345.	1.000
	3.37	3.37	345.	1.000
	6.75	6.75	345.	1.000
	10.1	10.1	345.	1.000
	16.9	16.9	345.	1.000
	23.6	23.6	345.	1.000
	30.4	30.4	345.	1.000
	37.1	37.1	345.	1.000
	43.9	43.9	345.	1.000
	50.6	50.6	345.	1.000
Process Water	1.69	52.3	189.	0.549
	3.37	54.0	153.	0.444
	6.75	57.4	135.	0.392
	10.1	60.7	130.	0.377
	16.9	67.5	127.	0.368
	23.6	74.2	121.	0.351
	30.4	81.0	120.	0.347
	37.1	87.7	120.	0.347
	43.9	94.5	120.	0.348
	50.6	101.2	118.	0.343
Formation Brine	1.69	103.	132.	
	3.37	105.	140.	0.404
	6.75	108.	157.	0.456
	10.1	111.	168.	0.486
	16.9	118.	177.	0.514
	23.6	125.	180.	0.522
	30.4	132.	183.	0.529
	37.1	138.	183.	0.529
	43.9	145.	183.	0.529
	50.6	152.	183.	0.529

7-18-00





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

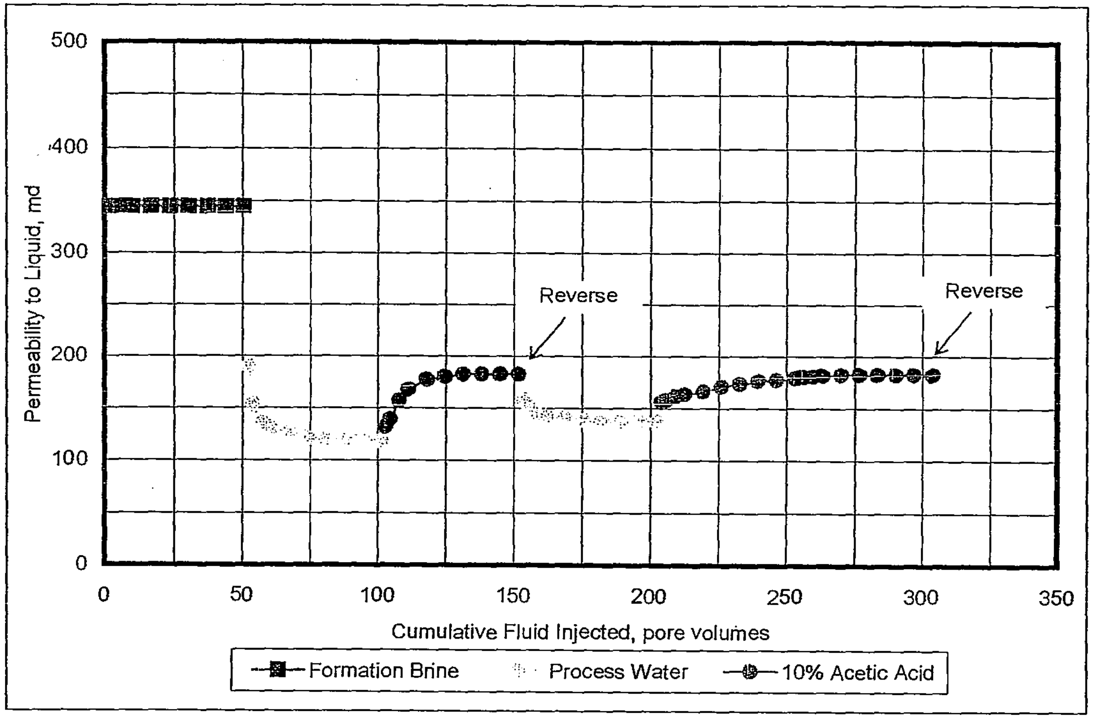
Extracted-State Sample

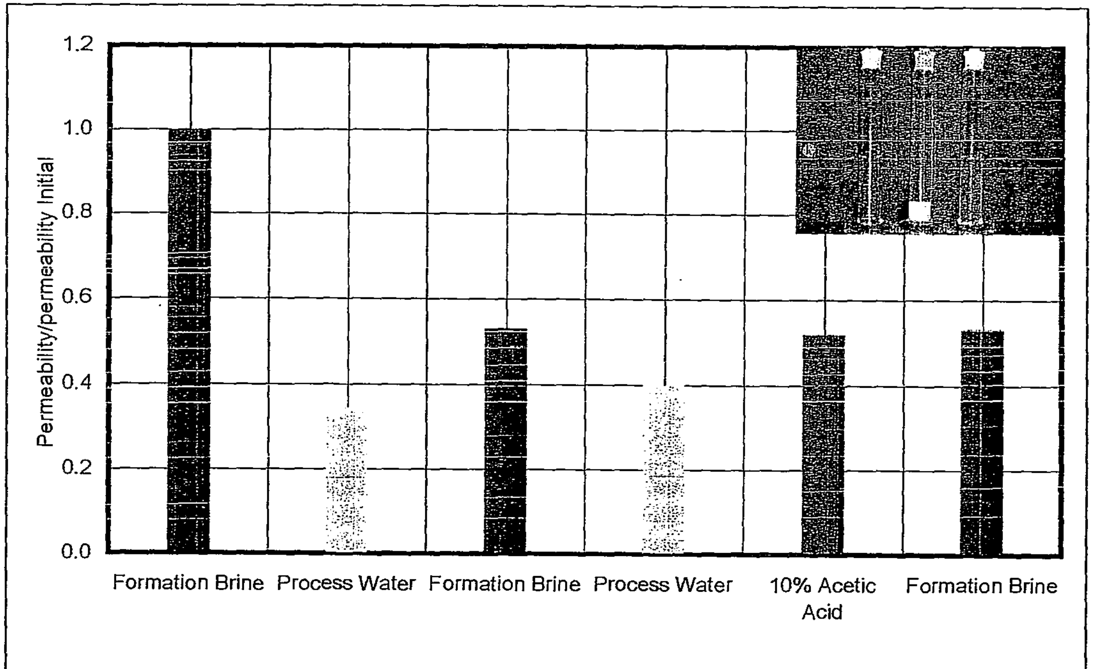
Net Confining Stress: 2000 psi   Temperature: 150°F

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-1
Sample Depth, feet:	6071.52
Permeability to Air, md:	518
Porosity, fraction:	0.317
Injection Fluid:	Formation Brine

Fluid Injected	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys	Permeability/ Permeability Initial
	fluid	total		
Process Water	1.69	154.	158.	0.457
	3.37	155.	153.	0.444
	6.75	159.	145.	0.419
	10.1	162.	143.	0.413
	16.9	169.	141.	0.408
	23.6	175.	139.	0.402
	30.4	182.	137.	0.397
	37.1	189.	137.	0.397
	43.9	196.	137.	0.397
	50.6	202.	137.	0.397
10% Acetic Acid	1.69	204.	156.	0.453
	3.37	206.	158.	0.459
	6.75	209.	162.	0.469
	10.1	213.	164.	0.475
	16.9	219.	166.	0.482
	23.6	226.	171.	0.496
	30.4	233.	174.	0.504
	37.1	240.	176.	0.511
	43.9	246.	178.	0.515
	50.6	253.	179.	0.519
Formation Brine	1.69	255.	180.	0.522
	3.37	256.	180.	0.523
	6.75	260.	181.	0.526
	10.1	263.	182.	0.527
	16.9	270.	183.	0.529
	23.6	277.	183.	0.529
	30.4	283.	183.	0.529
	37.1	290.	183.	0.529
	43.9	297.	183.	0.529
Reverse 7-18-00	50.6	304.	183.	0.529





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

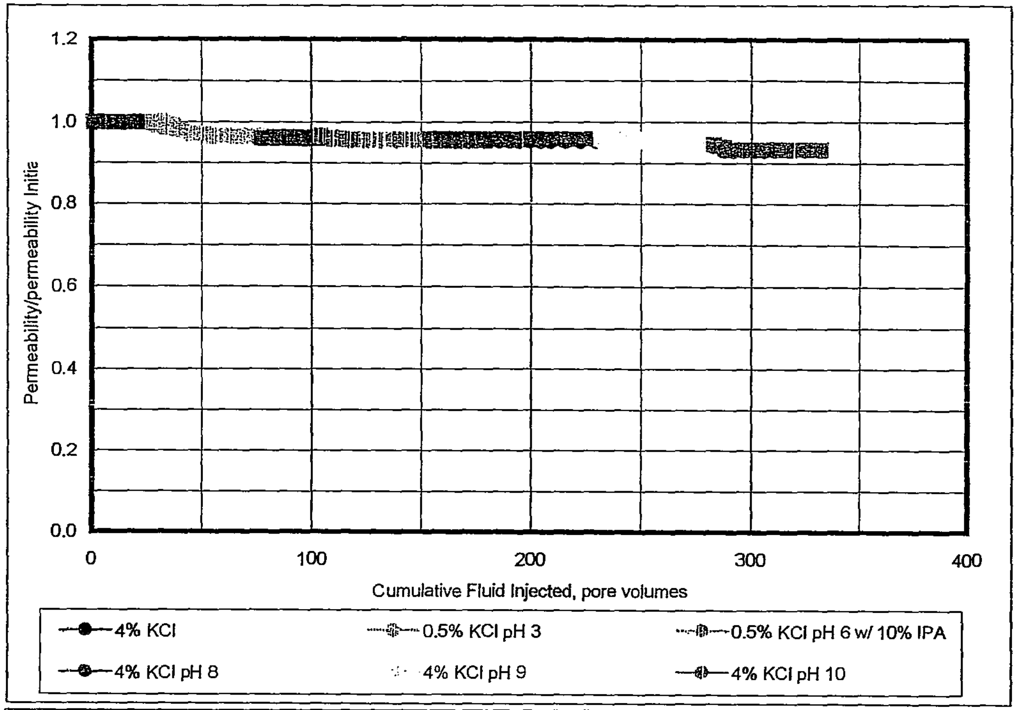
Extracted-State Sample

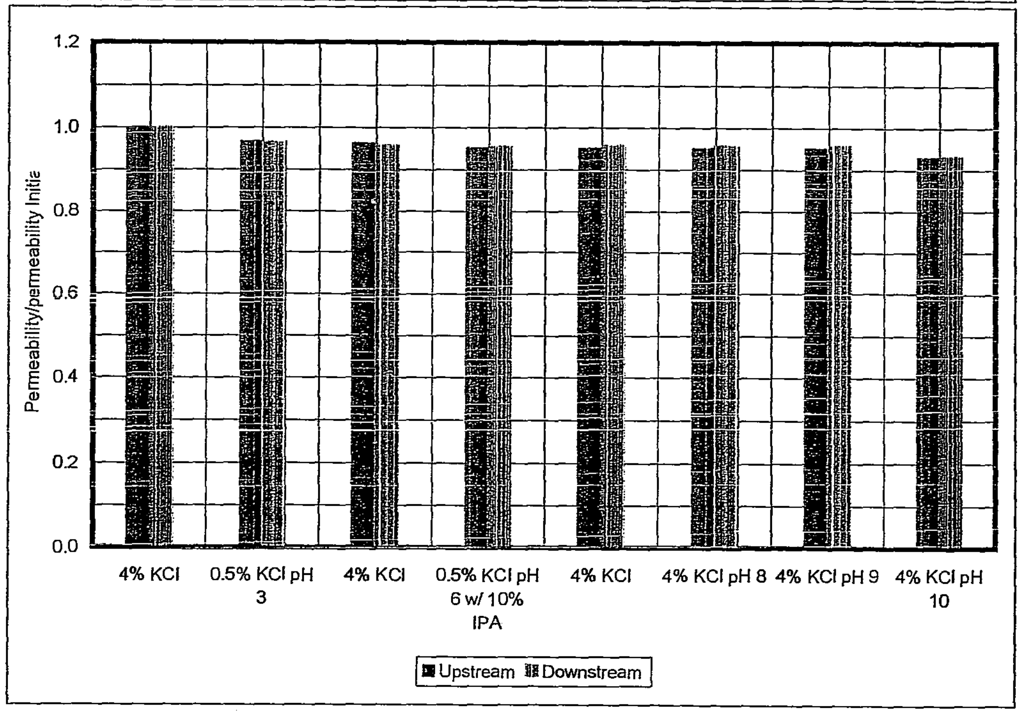
Temperature: 150°F   Net Confining Stress: 2000 psi

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-2
Sample Depth, feet:	6073.25
Permeability to Air, md:	882.
Porosity, fraction:	0.323
Injection Fluid:	4% KCl

Fluid Injected	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys		Permeability/ Permeability Initial	
	fluid	total	Upstream	Downstream	Upstream	Downstream
4% KCl	1.16	1.16	949.	685.	1.000	1.000
	3.48	3.48	949.	685.	1.000	1.000
	5.80	5.80	949.	685.	1.000	1.000
	8.13	8.13	949.	685.	1.000	1.000
	10.4	10.4	949.	685.	1.000	1.000
	12.8	12.8	949.	685.	1.000	1.000
	15.1	15.1	949.	685.	1.000	1.000
	18.6	18.6	949.	685.	1.000	1.000
	22.1	22.1	949.	685.	1.000	1.000
	25.5	25.5	949.	685.	1.000	1.000
0.5% KCl pH 3	2.32	27.9	939.	685.	0.990	1.000
	6.97	32.5	933.	685.	0.984	1.000
	11.6	37.2	930.	680.	0.980	0.993
	16.3	41.8	925.	670.	0.975	0.978
	20.9	46.4	921.	665.	0.971	0.971
	25.5	51.1	921.	665.	0.971	0.971
	30.2	55.7	917.	661.	0.967	0.964
	37.2	62.7	917.	661.	0.967	0.964
	44.1	69.7	917.	661.	0.967	0.964
	51.1	76.6	917.	661.	0.967	0.964
4% KCl	1.16	77.8	915.	657.	0.964	0.959
	3.48	80.1	915.	657.	0.964	0.959
	5.80	82.4	915.	657.	0.964	0.959
	8.13	84.7	915.	657.	0.964	0.959
	10.4	87.1	915.	657.	0.964	0.959
	12.8	89.4	915.	657.	0.964	0.959
	15.1	91.7	915.	657.	0.964	0.959
	18.6	95.2	915.	657.	0.964	0.959
	22.1	98.7	915.	657.	0.964	0.959
	25.5	102.	915.	657.	0.964	0.959





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

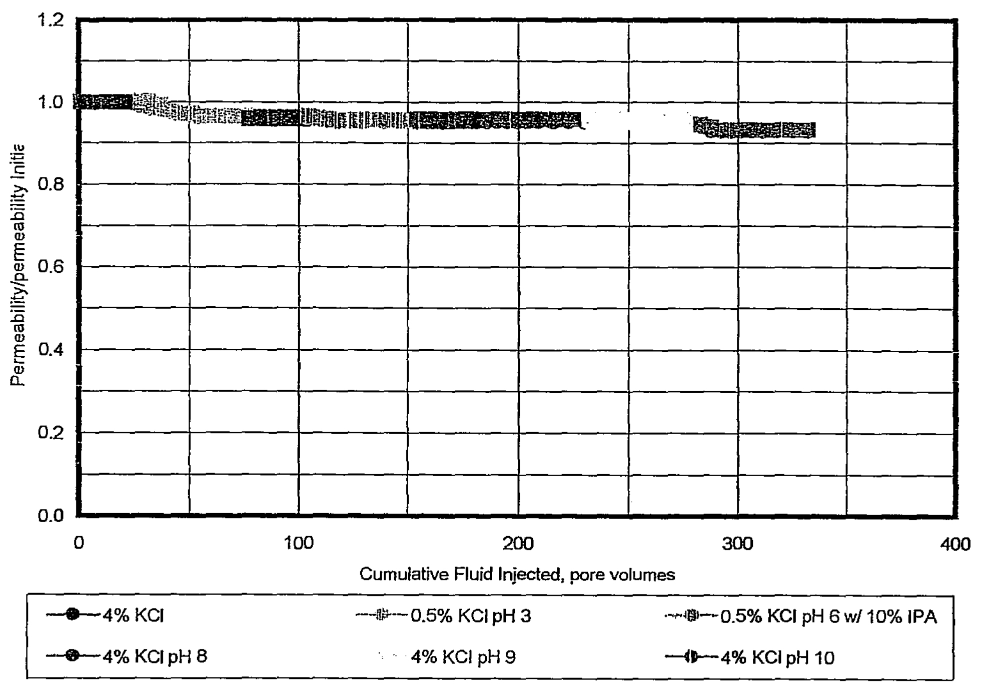
Extracted-State Sample

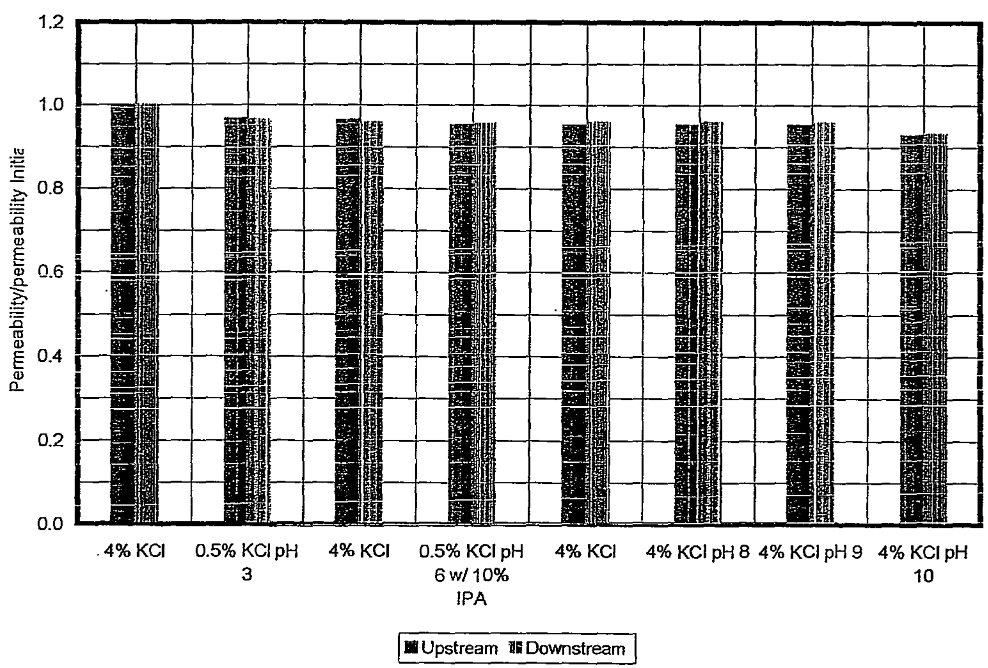
Temperature: 150°F Net Confining Stress: 2000 psi

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-2
Sample Depth, feet:	6073.25
Permeability to Air, md:	882.
Porosity, fraction:	0.323
Injection Fluid:	4% KCl

Fluid	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys		Permeability/ Permeability Initial	
Injected	fluid	total	Upstream	Downstream	Upstream	Downstream
0.5% KCl pH 6 with. 10% IPA	2.32	104.	912.	662.	0.961	0.967
	6.97	109.	908.	658.	0.957	0.961
	11.6	114.	906.	657.	0.955	0.959
	16.3	118.	904.	655.	0.953	0.956
	20.9	123.	904.	655.	0.953	0.956
	25.5	128.	904.	655.	0.953	0.956
	30.2	132.	904.	655.	0.953	0.956
	37.2	139.	904.	655.	0.953	0.956
	44.1	146.	904.	655.	0.953	0.956
	51.1	153.	904.	655.	0.953	0.956
4% KCl	1.16	154.	904.	657.	0.952	0.959
	3.48	157.	904.	657.	0.952	0.959
	5.80	159.	904.	657.	0.952	0.959
	8.13	161.	904.	657.	0.952	0.959
	10.4	164.	904.	657.	0.952	0.959
	12.8	166.	904.	657.	0.952	0.959
	15.1	168.	904.	657.	0.952	0.959
	18.6	172.	904.	657.	0.952	0.959
	22.1	175.	904.	657.	0.952	0.959
	25.5	179.	904.	657.	0.952	0.959
4% KCl pH 8	2.32	181.	904.	657.	0.952	0.959
	6.97	186.	904.	657.	0.952	0.959
	11.6	190.	904.	657.	0.952	0.959
	16.3	195.	904.	657.	0.952	0.959
	20.9	200.	904.	657.	0.952	0.959
	25.5	204.	904.	657.	0.952	0.959
	30.2	209.	904.	657.	0.952	0.959
	37.2	216.	904.	657.	0.952	0.959
	44.1	223.	904.	657.	0.952	0.959
	51.1	230.	904.	657.	0.952	0.959





OMNI Laboratories, Inc.

PERMEABILITY VERSUS THROUGHPUT

Extracted-State Sample

Temperature: 150°F Net Confining Stress: 2000 psi

Crossroads Enviromental
WDW 315 No. 1
Montgomery County, Texas
File No. H-3260

Sample Number:	2-2
Sample Depth, feet:	6073.25
Permeability to Air, md:	882.
Porosity, fraction:	0.323
Injection Fluid:	4% KCl

Fluid	Cumulative Fluid Injected, pore volumes		Apparent Permeability to Liquid, millidarcys		Permeability/ Permeability Initial	
Injected	fluid	total	Formation	Wellbore	Formation	Wellbore
4% KCl pH 9	2.32	232.	904.	657.	0.952	0.959
	6.97	237.	904.	657.	0.952	0.959
	11.6	241.	904.	657.	0.952	0.959
	16.3	246.	904.	657.	0.952	0.959
	20.9	251.	904.	657.	0.952	0.959
	25.5	255.	904.	657.	0.952	0.959
	30.2	260.	904.	657.	0.952	0.959
	37.2	267.	904.	657.	0.952	0.959
	44.1	274.	904.	657.	0.952	0.959
	51.1	281.	904.	657.	0.952	0.959
4% KCl pH 10	2.32	283.	893.	648.	0.941	0.946
	6.97	288.	883.	644.	0.930	0.940
	11.6	293.	883.	639.	0.930	0.933
	16.3	297.	883.	639.	0.930	0.933
	20.9	302.	883.	639.	0.930	0.933
	25.5	306.	883.	639.	0.930	0.933
	30.2	311.	883.	639.	0.930	0.933
	37.2	318.	883.	639.	0.930	0.933
	44.1	325.	883.	639.	0.930	0.933
	51.1	332.	883.	639.	0.930	0.933